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MONTHLY REPORT - AUGUST 1981

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MONTHLY REPORT - AUGUST 1981

STATUS OF PUBLICATIONS

Published

Kashin, S.M., R.W. Brill, W.N. Ikehara, and A.E. Dizon. 1981. Induced locomotion by midbrain stimulation in restrained skipjack tuna, Katsuwonus pelamis, L. J. Exp. Zool. 216:327-329.

The authors show that electrical stimulation of the midbrain of restrained and sedated skipjack tuna (Katsuwonus pelamis) produces coordinated locomotory activity. Their preparation therefore is a viable alternative for creating normal swimming movements which can be closely controlled by the experimentalist, and demonstrates that a midbrain "locomotory center" is present in skipjack tuna, as in other teleosts.

Weihs, Daniel. 1981. Effects of swimming path curvature on the energetics of fish motion. Fish. Bull., U.S. (Note) 79(1):171-176.

Technical Memoranda

Stock assessment activities within the National Marine Fisheries Service. June 1981. NOAA-TM-NMFS-SWFC-12, 130 pp + 34-page Appendix.

Status reports on world tuna and billfish stocks. July 1981. NOAA-TM-NMFS-SWFC-15, 300 pp + 2-page Appendix.

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

The following papers were published in NOAA-TM-SWFC-15:

Bartoo, Norman. Status report: North Atlantic albacore, pp. 87-97.

The North Atlantic albacore stock is fished by longline and surface gears. Surface catches (38,000 mt in 1979) have declined about 25% since 1960. Longline catches in 1979 were 11,000 mt. Available evidence indicates that MSY is about 60,000 mt, which is 10% to 15% above recent years' catches. Yield-per-recruit to the North Atlantic albacore fisheries is about 3.8 kg, with some increase possible with fishery changes. Recruitment indices indicate that spawning stock is low and recruitment highly variable. The fishery appears to be heavily exploited.

Bartoo, Norman. Status report: South Atlantic albacore, pp. 78-86.

Annual catches from the South Atlantic albacore stock have remained near 22,000 mt for the last few years. Current annual effort levels are near 100 million hooks, the level reached in 1972. Available evidence indicates that the stock is currently producing catches about 25% below estimated MSY and that a relatively high yield-per-recruit of about 7.7 kg is being realized. The South Atlantic albacore fishery supplies about 40% of the U.S. annual consumption through imports.

Coan, Atilio L., Jr. Status report: Atlantic yellowfin tuna, pp. 9-33.

The status of Atlantic yellowfin tuna stocks remained unchanged from 1979 to 1980. Production model analyses indicate that the stocks are being fished at high levels, especially in the eastern Atlantic. Increase in fishing effort with the fishery operating within its present geographical boundaries is unlikely to produce substantial gains in yield.

In 1973, a minimum size regulation was adopted for Atlantic yellowfin tuna to decrease fishing mortality on small fish and to increase yield-per-recruit (YPR). Analyses indicate that a slight increase in YPR has occurred for some fisheries since the adoption of the regulation. These gains may be less than predicted due to discarding of undersized fish.

Estimates of recruitment to the Atlantic yellowfin fishery have held relatively constant. Based upon these assessments, Atlantic yellowfin tuna stocks should be carefully monitored.

Coan, Atilio L., Jr., and Wesley Parks. Status report: Atlantic bigeye tuna, pp. 34-54.

Recent total annual Atlantic catches of bigeye tuna have averaged 41,000 mt. Major participants in the fishery include Japan, Korea, Spain and the USSR. The U.S. takes bigeye along with yellowfin and skipjack tuna in its eastern Atlantic tropical tuna purse seine fleet. Recent U.S. catches have been less than 500 mt.

The stock structure of bigeye tuna in the Atlantic is uncertain. Hypotheses include a single Atlantic-wide stock and separate north and south stocks. Catch-per-unit-effort shows slight decreasing trends.

Production model analysis estimates MSY in the range of 52,000-123,000 mt. Recent catches are below MSY. Recent estimated effort levels are 25 to 50% less than optimum effort. Analyses suggest that with current fishing patterns, increasing age-at-first-capture would slightly increase equilibrium yield-per-recruit.

The International Commission for the Conservation of Atlantic Tunas adopted a minimum size limit of 3.2 kg for bigeye tuna in 1979. The regulation, intended to increase yield-per-recruit, has not been in effect long enough for its effectiveness to be assessed.

Evans, Richard H., and Norman Bartoo. Status report: Atlantic skipjack tuna, pp. 55-77.

Eastern Atlantic skipjack tuna stocks are currently fished at a high level (100,000 mt in 1980) while western Atlantic stocks are fished at a low level (9,000 mt in 1980). CPUE indices for both the French-Ivory Coast-Senegal-Morrocan and Tema-based fleets, which are quite different and show no clear trend over time, are not considered to be adequate estimators of abundance. Available evidence indicates that neither western nor eastern Atlantic skipjack stocks are overfished at this time, and both stocks may effectively support increased fishing effort. This seems especially true for the western Atlantic, where a developing fishery off Brazil accounted for 80 percent of the western Atlantic catch in 1980.

Hanan, Doyle A. Status report: North Pacific bluefin tuna, pp. 246-255.

Northern Pacific bluefin tuna are fished by surface gear including purse seine, trolling, bait, gill net, trap, and harpoon in the eastern and western Pacific. Bluefin are also caught by longline

in the western Pacific and, to a lesser extent, in the central and eastern Pacific and the east Indian Ocean.

The resource appears to be composed of a single stock; the western Pacific catch is composed of juveniles and mature adults while the eastern Pacific catch consists mainly of 1-, 2-, and 3-year old fish. Presence of a second stock off New Zealand is not confirmed by studies.

Herrick, Samuel F., Jr. Status report: Eastern tropical Pacific yellowfin tuna, pp. 143-162.

The status of eastern Pacific yellowfin tuna has been evaluated using general production models and age-structured models. Results of the production model analyses indicate that the eastern Pacific yellowfin fishery is currently operating at levels above maximum sustainable yield. The age-structured analyses raise concerns over the increased dependency of the fishery on age-1 fish. Recent increases in age-1 catches could lead to a decrease in yield-per-recruit and a diminished potential yield. Heavy fishing on a succession of poor recruit classes could reduce the adult population such that recruitment failure occurs. Efforts to reverse these trends in the near future are complicated by a failure to reach agreement on a mechanism for implementing an eastern Pacific yellowfin conservation program in 1980.

Riggs, Fletcher V. Status report: Tunas in the Indian Ocean, pp. 99-117.

The status of stocks of four species of tuna (albacore, bigeye, yellowfin, and skipjack) in the Indian Ocean was analyzed. Since 1962 estimated annual catch of albacore in the Indian Ocean has fluctuated widely between 10,000 and 28,000 mt. The estimated catch for 1978 was 14,600 mt. MSY lies between 15,000 and 20,000 mt. A yield-per-recruit assessment suggests no gain in yield-per-recruit from harvesting the younger fish as fishing effort moved into more southerly waters. This stock appears fully harvested and there appears to be no reason for concern over the future of the stock at this time.

Estimated annual catch of bigeye tuna in the Indian Ocean reached a high of 48,600 mt in 1978. A production model analysis did not produce a reliable prediction of MSY. The yield curve showed increasing catch with effort and did not reach an asymptote. This stock appears to be only lightly exploited.

Yellowfin tuna in the Indian Ocean are fished by surface and longline gears. Estimated annual catch fluctuated widely from 1952 to 1978 but exhibited a general upward trend. The estimated total catch for 1978 was 62,500 mt. Production model analyses based on available longline fishery data suggest an MSY for that fishery of around 40,000 mt. Due to rather inaccurate total catch estimates,

however, MSY may be higher. It is unlikely that longline catch could be increased appreciably above the current level. However, it is generally felt that there is a potential for increased landings of yellowfin tuna by surface fisheries.

The surface skipjack tuna fishery in the Indian Ocean is relatively undeveloped. Catches have fluctuated from 1965 on a generally rising trend. Estimated catch for 1978 was 32,600 mt. There have been no quantitative assessments of the Indian Ocean skipjack tuna stock.

Rinaldo, Ronald G. Status report: Eastern tropical Pacific skipjack tuna, pp. 163-181.

The stock structure of skipjack tuna in the Pacific Ocean is poorly understood. In the eastern Pacific fishery for skipjack tuna, there appears to be no significant relationship between effort and apparent abundance. Yield-per-recruit analysis on a partial stock indicates a maximum yield-per-recruit could be obtained at a greater fishing effort than is currently applied. According to the IATTC, the fishery for skipjack tuna in the eastern Pacific does not appear to affect stock abundance, and there is no need to restrict the catch.

Squire, James L., Jr. Status report: Pacific swordfish, pp. 256-276.

The stock structure of swordfish populations in the Pacific is not clear. Information and data evaluated at the Billfish Stock Assessment Workshop suggest that the population consists of either a single Pacific-wide stock, or northwestern, southwestern, and eastern Pacific stocks. For the 1952-1963 data series, a production model analysis gave a Pacific-wide MSY estimate of 20,000 mt with an effort level of 2.2 million hooks/5° area. The average (1966-1975) catch of 14,000 mt produced by 1.8 million hooks/5° area indicates that the fishery does not appear to be overexploiting the stock, and that the stock is in good condition.

Recent catches (1978) indicate levels of total catch equalling about 18,000 mt, approximately 2,000 mt less than MSY. High demands world-wide may drive the catch figure to the level of current MSY estimates or above within a short period of time.

Weber, Earl. Status report: North Pacific albacore, pp. 228-245.

The North Pacific albacore stock is harvested primarily by the Japanese surface and longline, and North American surface fleets. Catches of these fleets have been in the vicinity of 100,000 mt in recent years, with a record catch of nearly 124,000 mt in 1976. The North American surface fishery, comprised primarily of U.S. troll vessels, landed an annual average catch of approximately 20,000 mt during the period of 1969 through 1978 but landed less

than 5,000 mt in 1979. The U.S. imports an additional 80,000 to 90,000 mt of albacore to meet domestic demand and a substantial part of this originates from the North Pacific stock.

Although heavily harvested, the stock is considered healthy. Effort levels in recent years have been below those required to produce maximum average sustainable yields (MASY). Yield-per-recruit (Y/R) analyses indicated a decrease in Y/R following the expansion of the Japanese surface fishery. Slight gains in Y/R are possible through increased effort on larger fish but substantial gains are unlikely with the fishery in its present configuration. Catch rates for all three major fleets have shown gradual decreasing trends.

Wetherall, Jerry A. Status report: South Pacific albacore, pp. 212-227.

The South Pacific albacore stock has been fished since 1952. Most of the catch is taken by longline vessels from Japan, the Republic of Korea, and Taiwan. Longline catch-per-unit-effort declined considerably between 1962 and 1974 as effort and catch increased. However, catch rates increased in recent years so that average annual catch has increased recently in spite of lowered effort. Present average annual catch by longliners is in the neighborhood of the estimated MSY for this fishery, 35,000 mt, and no sustained increase in longline catch can be expected. Potentials for expanding the surface catch of relatively small albacore are unknown.

Yoshida, Howard O. Status report: Billfishes in the Indian Ocean, pp. 118-141.

Billfishes are caught primarily as a by-catch on longline gear set to catch tunas in the Indian Ocean. Most of these billfishes appear to be sold in Japan where striped marlin brings the highest price, followed by swordfish, blue marlin, and black marlin. Tentative results from production model analyses indicate that no significant increase in total yield can be expected for blue and black marlin, whereas striped marlin yields could increase with increased effort. Swordfish and sailfish stocks do not appear to be adversely affected by current levels of fishing efforts. Additional statistics must be collected from the fleets of participating nations to give a clearer picture of stock status in these waters.

Yoshida, Howard O. Status report: Pacific striped, blue, and black marlins, pp. 277-300.

The blue marlin, striped marlin, and black marlin are primarily caught by longline gear in the Pacific. The available evidence suggests that blue marlin comprise a single equatorially-centered stock in the Pacific. Two hypotheses have been advanced for

striped marlin stocks in the Pacific. The available evidence suggests the possibility of a multiple (two or three) stock structure for black marlin in the Pacific: one in the eastern Pacific and two in the western Pacific. The production model analysis, together with the declining catch rate, suggests that the Pacific blue marlin stock is being overfished. On a Pacific-wide basis, the striped marlin stock appears to be in good condition. No production model analysis is available for the Pacific black marlin. A high priority task is to better define the stock structure of marlins in the Pacific.

Yoshida, Howard O. Status report: Western Pacific skipjack tuna, pp. 182-195.

The major fisheries for skipjack tuna are located adjacent to continents and islands. In the western Pacific, the Japanese pole-and-line, live-bait fishery is the largest and the oldest established fishery. The stock structure of skipjack tuna in the Pacific is not very well known. Although no production model analyses or other analyses and simulations have been attempted for western Pacific skipjack tuna, all available information suggests that the resource is still underexploited. One of the important research needs for skipjack tuna in the Pacific is the elucidation of the population structure of the resource.

Yoshida, Howard O. Status report: Western Pacific yellowfin tuna, pp. 196-211.

Yellowfin tuna are primarily caught by longline gear in the western Pacific. Although the stock structure of yellowfin tuna is not well known, it has been hypothesized that there are two separate stocks in the Pacific, one in the eastern Pacific and the other in the western Pacific, which are separated by a less clearly defined stock in the central Pacific. A stock production model based on longline catches of yellowfin tuna in the entire Pacific indicated that the stock is capable of sustaining the current level of catches.

Approved by Center Director

Adams, Michael F. Competition and market structure in the Hawaii fish industry. For consideration for publication in the Joint Annual Conference Proceedings of the Western Association of Fish and Wildlife Agencies and Western Division, American Fisheries Society.

Burgess, Lourdes Alvina. Four new species of squid (Oegopsida: Enoploteuthis) from the central Pacific and a description of adult Enoploteuthis reticulata. For consideration for publication in the Fishery Bulletin, U.S.

Hobson, E.S. and J.R. Chess. Diel movements of zooplankters in the lagoon at Enewetak Atoll, Marshall Islands. For consideration for publication in the Fishery Bulletin, U.S.

Huppert, Daniel D. Economic research needs for living marine resources. For consideration for publication in Symposium Papers: Workshop on Ocean Resources Economics.

Lo, Nancy C.H. Sample size for stratified ratio estimator of dolphin mortality. For consideration for publication in the Journal of Wildlife Management.

Administrative Reports

Honolulu Laboratory

Humphreys, Robert L., Jr. Hawaiian monk seals and sea turtles--Sightings and direct interactions with fishing operations in the Northwestern Hawaiian Islands. SWFC Admin. Rep. H-81-6.

Translations

Japan Fisheries Agency. 1974. Survey of the North Pacific seamounts (Kita Taiheiyō kaizan chōsa). Report of Kaiyo Maru survey cruises, 1972 season, March 1974, 136 p. (Engl. transl. by Tamio Otsu, 1981, 55 p., Transl. No. 54; available Southwest Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812).

Kurata, Yoji, Sumio Yoneyama, Kiyoki Tsutsumi, Johnson Kimura, and Susumu Hosokawa. 1978. Experiments to increase numbers of green turtles through the release of the young (VII. Aoumigame zōshoku horyu shiken). Ogasawara Fishery Center, Tokyo Metropolitan Government, February 1978, Research Report No. 3, p. 58-80. (Engl. transl. by Tamio Otsu, 1981, 27 p., Transl. No. 56; available Southwest Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812).

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Final Tripartite Cruise to the Northwestern Hawaiian Islands Completed

Richard N. Uchida, Task Leader of the Insular Ecosystem Study, reports that the NOAA research vessel, Townsend Cromwell, returned to Snug Harbor, Honolulu, on August 27, 1981, after completing Cruise 81-04, a 42-day cruise to the Northwestern Hawaiian Islands (NWHI). Uchida said that this was the last in a series of NWHI survey and assessment cruises which began in October 1976 under the original Tripartite Cooperative Agreement with the U.S. Fish and Wildlife Service and the State of Hawaii's Department of Land and Natural Resources. (The University of Hawaii's Sea Grant Program later became a participating agency in this massive investigation of the living terrestrial and marine resources of the NWHI.)

Chief Scientist Reginald M. Gooding reports that the scientific field party made excellent observations with good photographic documentation of uluas feeding on surface-released sublegal and berried lobsters; other experiments proved definitely that lobster offal and carcasses, which were either tied or inserted in the trap, repelled live lobsters. Assisting Gooding on the cruise were Research Assistants Steven H. Kramer, Michael P. Seki, James L. Prescott, and Gordon W. Tribble.

Spiny Lobster Carapace Length Vs. Tail Width Equivalence Re-examined

In response to some questions raised on the carapace length vs. tail width equivalence for spiny lobster, Panulirus marginatus, in the draft Fishery Management Plan, Statistician Dr. Jeffrey J. Polovina and Research Assistant Darryl T. Tagami reviewed all the available spiny lobster data and performed further statistical analyses. These analyses included the preparation of two-way contingency tables of carapace length vs. tail width to classify legal and sublegal lobsters, more runs of the discriminant analysis, computation of carapace length vs. tail width regressions by sex and area, and a detailed examination of size-frequency distribution of lobsters by cruise, geographic area, and sex. These analyses provided further support for the rationale in using the original statistical procedures.

The results of the new statistical analyses were presented at a meeting which included members of the Plan Development Team, Scientific and Statistical Committee, and Advisory Subpanel of the Western Pacific Regional Fishery Management Council (WPRFMC). After much discussion it was agreed that a proposal of a 5.0 cm minimum tail width, with an allowance that 20% of the total catch could be between 4.5 and 5.0 cm tail width (to allow for the

variation in the tail width vs. carapace length relationship), would be submitted to the WPRFMC. However, it was later determined that a 15% tolerance factor would be a more realistic and accurate value. These results were incorporated into Administrative Report H-81-3 (see Status of Publications, June 1981 issue of Southwest Fisheries Center Monthly Report) which included the original analyses.

Progress Made on Identification of Fishes

Research Assistant Robert B. Moffitt continues to identify fish specimens collected on recent cruises of the NOAA Ship Townsend Cromwell and charter vessels. Members of the family Priacanthidae have presented some problems in identification due to inaccuracies found in certain published keys and a lack of reference specimens of Priacanthus cruentatus. Moffitt examined 26 P. alalaua (a probable junior synonym of P. hamrur), 4 P. cruentatus, and 2 P. meeki from the collections of the Honolulu Laboratory and the Bishop Museum. He found that P. meeki has 14 dorsal soft rays whereas P. cruentatus and P. alalaua have only 13 (P. alalaua is listed as having 14 in a published key). Preopercular spine lengths vary considerably in P. alalaua and cannot be used as a key character to separate it from P. cruentatus. The number of scales in a longitudinal series can be used to separate P. meeki from P. alalaua, but the counts are large and difficult to make on such small scales. The scaleless border on the preopercle is present in P. cruentatus but is difficult to describe without diagrams. The best single character to use in separating the three species of Priacanthus is the number of gill rakers on the lower portion of the first gill arch. There are 14-16, (mostly 15, one had 16, and five had 14) in P. alalaua, 17-18 (one had 17, three had 18) in P. cruentatus, and 23 in P. meeki. In addition, preserved specimens of P. alalaua have black pelvic fins whereas those of P. cruentatus are not black.

Also of interest is a hagfish, taken in a shrimp trap at a depth of 1,091 m (600 fathoms) on Esmeralda Bank, Northern Mariana Islands, which is apparently an undescribed species of Eptatretus.

Studies Continue on Fecundity and Monitoring of Ehu

This month Research Assistant Alan R. Everson continued his studies on fecundity and maturation of the ehu, Etelis marshi. The preliminary results indicate that the eggs first begin developing in May-June and reach maturity in August and September. Residual eggs were found in ovary samples collected from October through December. Samples collected for the other months of the years showed almost entirely small immature eggs.

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Research Assistant Robert L. Humphreys, Jr. completed an Administrative Report, "Hawaiian monk seals and sea turtles--sightings and direct interactions with fishing operations in the Northwestern Hawaiian Islands."

* * * * * * * * * *

Richard N. Uchida, Study Leader, has completed the first draft of a Guam/Northern Mariana Islands background document. Aided by Research Assistants Darryl Tagami and Karen P. Wendel, Uchida also began analysis of data on armorhead, Pentaceros richardsoni, and alfonsin, Beryz splendens.

FISHERY MANAGEMENT PROGRAM

Hawaii Skipjack Tuna Landings Continue Below Long-Term Average

The August 1981 Hawaii landings of skipjack tuna were estimated at 337 metric tons (MT), which is 52 MT below the August 1980 landings and 246 MT below the 1964-79 long-term average for August. The cumulative landings from January through August were estimated at 1,743 MT, which is 505 MT above the 1980 landings for the same period and 1,342 MT below the 1964-79 long-term average for the same period (Figure 1).

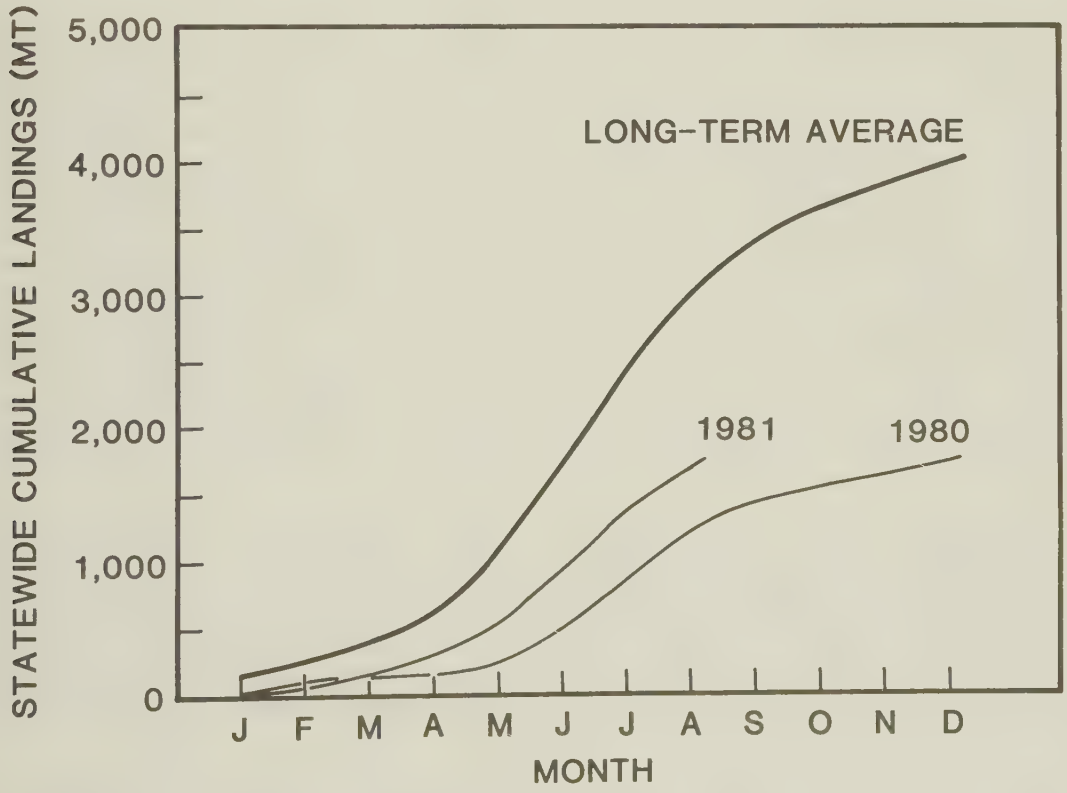

Figure 1. Cumulative landings in the Hawaiian skipjack tuna fishery.

PELAGIC RESOURCES INVESTIGATION

Magnetite Confirmed as Magnetic Material in Tuna Skulls

Michael M. Walker, University of Hawaii graduate student, reports that the magnetic material located within the ethmoid bone complex in the skulls of yellowfin has been successfully extracted and analyzed. Magnetically clean dissections of 35 yellowfin tuna skulls were made and the tissue from within the ethmoid bones removed. The collected tissue was ground with a teflon pestle, the fats were extracted with ether, and the remaining tissue digested in 5.25% sodium hypochlorite solution (household bleach). After centrifuging and washing, a colorless residue remained. When a strong magnet was brought up to the side of the test tube, small black particles aggregated near the magnet and followed it as it was moved.

An x-ray diffraction pattern obtained from one of these particles showed that it contained magnetite ($FeO.Fe_2O_3$), the material believed to be the likely basis for the magnetic sense in tuna. This mineralogical study of the magnetic material in the heads of tuna confirms previous magnetometry studies which indicated that the material could be magnetite.

Attempts to Rear Larval Skipjack Tuna Continue

Dr. Andrew E. Dizon, Leader of the Pelagic Ecosystem Study Task, reports that attempts to rear larval skipjack tuna continue at the Kewalo Research Facility. On July 28, fertilized eggs resulting from the stress-induced spawning of adult skipjack tuna were collected. Half of the fertilized eggs were rinsed in autoclaved seawater, put in bags of autoclaved oxygenated seawater, and shipped to Dr. John R. Hunter, Fishery Biologist at the Southwest Fisheries Center's La Jolla Laboratory. Dizon noted that this batch of eggs was about 10% smaller than normal 1.0 mm skipjack tuna eggs. Using the same techniques used by researchers at the Kewalo Research Facility, Hunter and Fishery Biologist Carol Kimbrell reared the resulting skipjack tuna larvae at the La Jolla Laboratory. Results of the simultaneous rearing attempts at La Jolla and the Kewalo Research Facility were identical. The fertilized eggs were successfully hatched but large mortalities occurred after about 4-5 days.

On August 3 fertilized eggs were again collected from stress-induced spawning of skipjack tuna and once again half of the eggs were sent to Hunter. The mean diameter of eggs from this spawning was 0.92 mm, slightly larger than the eggs from the earlier spawning. Many of the larvae that hatched from these eggs had jaw deformities, which prevented the larvae from feeding successfully. The larvae reared at La Jolla survived 4 days whereas those reared at Kewalo survived 5 days.

The early mortalities observed in the two rearing attempts were attributed to the small size of the spawned eggs. Oxygen, food, and water quality were apparently not the cause of the deformities which led to

starvation and death. These results suggested to Dizon that it is not likely that mortality problems experienced earlier were caused by poor quality water at the Kewalo Research Facility.

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Thomas S. Hida, Fishery Biologist, made changes in the seabird spew data set based on crustaceans identified recently by Dr. Austin Williams of the U.S. National Museum.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Fifth Albacore Physiology Cruise Completed

Dr. R. Michael Laurs, Oceanographer and Program Leader, reports that the fifth in a series of summer cruises investigating albacore physiology has been completed. Laurs organized and led the cruise, conducted in three legs between July 23 and August 12. Personnel aboard the Southwest Fisheries Center's research vessel, David Starr Jordan, included 23 scientists and technicians from the SWFC, the School of Medicine and the Department of Biology at the University of California, San Diego, the Scripps Institution of Oceanography, and the California Department of Fish and Game.

A number of physiological/biochemical experiments were conducted during the first two legs of the cruise, including studies on hemodynamics and cardiac function, blood chemistry, thermoregulation, chromosome karyotyping, and respiration; the respiration study was continued during the third leg of the cruise. Efforts during the last leg of the cruise were directed towards working with a chartered fishing vessel on sonic tracking and live transport of albacore to shore facilities. However, this vessel experienced engine failure immediately after departure, delaying the tracking project. During the cruise albacore were caught in sufficient quantities to conduct the experiments, but proved too large for live transport. Past experience has shown that only albacore less than 70 cm fork length will survive the handling. A summary of the results of the physiology studies is being prepared.

Albacore Sonic Tracking Experiment Conducted

The fishing vessel, Lady Phyllis, chartered by the American Fisherman's Research Foundation to conduct sonic tracking of albacore in cooperation with the NOAA research vessel, David Starr Jordan, lost use of its main engine on the first day of the charter. While awaiting repair of the vessel, Ron Dotson, Biological Technician, and Lt. Al Jemison, NOAA Corps Officer assigned to the SWFC's Honolulu Laboratory, reviewed the sonic tracking data collected during 1979 and 1980 cruises and prepared them for publication.

A second vessel, the Greek Isle, was finally selected for the charter when the time limitations on repairs to the Lady Phyllis excluded her from consideration. The Greek Isle departed on August 18, with Jemison, Dotson, and Biological Aid Gary Hunt on board as scientific observers. Tracking

experiments were conducted 200 miles southwest of Pt. Conception, California, during the 10-day charter. Despite rough seas, poor fishing, and some equipment breakdowns, five albacore were tagged with ultrasonic transmitters. One transmitter failed immediately but the others worked well and four tracks of 12 to 24 hours were obtained. The fish moved generally northeast during tracking and spent a large part of their time at the thermocline in depths ranging from 250 ft to 600 ft (80-200 m). Information on swimming speed and nocturnal diurnal changes in behavior will be reported after analysis of the data.

Satellite Remote Sensing Applications in Fisheries Research

Satellite Images Provide Support for Albacore Physiology Cruise

This month Randee Recht, Remote Sensing Specialist, reviewed infrared images from the NOAA-6 satellite in order to provide real-time support for the albacore physiology cruise being led by Oceanographer Dr. R. Michael Laurs aboard the David Starr Jordan, and for the albacore sonic tracking project aboard the Greek Isle. The Scripps Satellite-Oceanography Facility (formerly the Scripps Remote Sensing Facility) reserved prime image-processing hours for Recht following each daily pass of the NOAA-6 satellite. Recht reviewed each daily satellite image as well as those collected from the previous night to look for cloud-free areas about the ship operations. This support was required to assist in the deployment of the ships to find favorable fishing regions (usually about thermal fronts) and to record ocean features for correlation with movement of sonically-tracked albacore. During both research experiments clouds frequently covered much of the region off southern California. One image having a large clearing was collected and processed prior to the cruise. During the albacore physiology cruise Recht processed and relayed two images to the Jordan via radio facsimile. Additional images were collected during the sonic tracking experiments which followed the Jordan cruise.

Review of 1981 Albacore Season to Date

Dr. R. Michael Laurs, Oceanographer, Robert Nishimoto, Fishery Biologist, and Ron Dotson, Biological Technician, report that estimates of 1981 albacore landings to date exceed total landings for the prior 2 years but fall well below the 10-year average. As of August 31, an estimated 7,500 tons of albacore had been landed in U.S. west coast ports; seasonal totals for 1979 and 1980 were 6,400 tons and 6,000 tons, respectively. These totals fall far below the recent 10-year average of 19,800 tons.

The 1981 albacore season began approximately a week earlier than normal with catches in mid-June off southern California and in early July off northern California to southern Oregon. Albacore remained in southern California waters through August and as in 1980, much of the catch was taken more than 200 miles offshore. The traditional favorable region within 200 miles of the Pacific Northwest Coast was productive for only 3 weeks during

July. During July more consistent catches were made 700 to 1,000 miles west of Crescent City, California; by mid-August this zone had shifted northeastward to 400 to 600 miles off Grays Harbor, Washington. Albacore boats typically make good catches off central and northern California by mid-August, and in some years a large portion of the catch has been taken in this region between late August and the end of October. This year's catch therefore could still increase substantially. Early fall storms or the early departure of the fish, on the other hand, could abbreviate the fishing season.

The treaty between the United States and Canada which has opened ports and provided albacore fishing privileges, seems to have had little effect on landings this year. Apparently albacore were available only in small numbers in Canadian waters and rough seas held down the fishing effort.

LARVAL FISHES, COASTAL EAST PACIFIC

Study Begins on Starvation in Jack Mackerel Larvae

This month Fishery Biologist Gail Theilacker began a pilot study to determine the incidence of starvation in field-collected jack mackerel larvae. This study will determine the numbers of larvae needed from each collecting station to provide good estimates of the incidence of starvation as related to size and age. The study is part of a continuing investigation of the factors which affect the survival of fish larvae.

During a cruise aboard the research vessel, David Starr Jordan, last summer, Theilacker and LCDR Roger Hewitt, NOAA Corps, collected jack mackerel larvae from a 24 square-mile area about 200 miles off San Diego, California. Within the area a larval-density gradient was apparent: larval densities decreased from 200 larvae per sample in the grid center to 0-30 larvae per sample around the periphery. The collected larvae were then examined in the laboratory to evaluate the incidence of starvation, using laboratory-determined morphological and histological criteria. This process required that each larvae has five body measurements taken before preparation for histological examination.

Richard Kiy, NOAA Junior Fellow, measured all the larvae from a central-grid station. The sample contained 233 larvae, ranging in size from 2.3 to 5.1 mm standard length; the median size was 3.4 mm. Frequency distribution was normal. In order to determine the incidence of starvation, one-third of these larvae, containing examples from each of four size classes (< 3.0 mm, 3.0-3.49 mm, 3.5-3.99 mm, and > or = to 4.0 mm), will be examined histologically. Jack Metoyer, Biological Technician, is assisting Theilacker with the histological preparation.

Theilacker and Hewitt ultimately plan to determine whether starvation of larval jack mackerel is density-dependent. The final analysis will be designed to remove possible variabilities in condition due to size and age so that the variability in condition due to density can be tested.

MULTISPECIES TAXONOMY PROGRAM

Data on Vertical Distribution of Anchovy Eggs, Larvae Being Processed

Rich Charter, CalCOFI Data Manager, and Carol Miller, Student Aid, are working with Dr. Geoff Moser, Leader of the Multispecies Taxonomy Program, to process data for the vertical distribution Cruise 8003-EB. Charter and Miller have compiled data on the day/night vertical stratification of anchovy eggs and larvae at two stations in the Southern California Bight, and are presently analyzing the vertical distribution of anchovy larvae by size class and the age-specific vertical distribution of anchovy eggs.

Staging of Anchovy Eggs Completed

Dr. Geoff Moser, Fishery Biologist and Program Leader, reports that staging of the anchovy eggs collected by CalVET nets on Cruises 8102-JD and 8104-JD was completed on August 31. A total of 1,176 samples was processed and the data were given to Dr. Gary Stauffer, Fishery Biologist in the Commercial and Recreational Fisheries Research for Management Program, for use in that program's egg production method for the annual anchovy biomass estimate.

Early Life Histories of Several Marine Species Being Prepared

This month Fishery Biologist Barbara Sumida-MacCall continued to work on her description of the early life history of important carangid species in the CalCOFI area, and Biological Technician Betsy Stevens made progress on her study of reproduction and early life history of Hypsoblennius. Summer student Bao Nguyen prepared drawings and background data for a description of the early life history of the cusk eel, Otophidium scrippsi. Under Stevens' supervision, student volunteer Imogen Coe continued her excellent work of reorganizing the egg and larvae reference collection.

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Fishery Biologists John Butler and Dr. Geoff Moser have completed a manuscript on the rearing and early life history of four species of rockfish (Sebastes). The paper was presented at a workshop on the widow rockfish organized by Dr. William Lenarz, Fishery Biologist at the Tiburon Laboratory, SWFC; the paper will be included in a compilation of the workshop contributions.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT PROGRAM

1980 Egg Production Estimate of Anchovy Spawning Biomass Reviewed

This month Dr. Gary Stauffer, Fishery Biologist, and Susan Picquelle, Statistician, met with Dr. Don McCaughran, Director of the International Halibut Commission, in order to review the statistical properties and procedures of the parameters used in the egg production method, and to discuss the resulting anchovy biomass estimates. Prior to the meeting, Picquelle had reviewed McCaughran's comments in detail and had prepared a response to his suggestions (see related story in the July 1981 issue of the SWFC Monthly Report). The following conclusions were reached at the meeting: 1) treating the sample design of midwater trawl collections as subsampling or two-stage sampling is proper; 2) the variance of the various estimators could probably be reduced with stratification of egg and trawl samples; 3) McCaughran's spawning and mortality models for estimating daily egg production are more elegant and will be used from now on; and 4) the probability distribution of the individual parameter estimates and the resulting distribution and variance of the biomass estimator need to be studied using Monte Carlo simulation techniques.

New Design for Anchovy Trawl Survey Being Tested

This month Statistician Susan Picquelle experimented with a new design for the trawl survey for anchovy. The purpose of this design is to avoid sampling problems which may be biasing some of the parameter estimates used in the egg production method of estimating biomass. Apparently spawning behavior affects the vulnerability of female anchovies to midwater trawl. This is suggested by a systematic change in the sex ratio and proportion of spawning females during the evening spawning cycle. One way to avoid this source of bias is simply not to take trawls during these hours. In order to examine this possibility, Picquelle estimated the parameters in the egg production biomass formula, first using all of the data from the 1980 trawl survey, and then using a revised data set omitting trawls taken between 2100-2359. If this technique proved effective, then the two estimates of spawning fraction (proportion of females with day-0 post-ovulatory follicles and proportion of females with day-1 post-ovulatory follicles) would be in closer agreement with each other, both estimates would fit the binomial distribution better, and the variability in the sex ratio estimate would be reduced. The first two of these three criteria were satisfied, thus indicating that this sample design may be an acceptable method of avoiding sampling bias due to spawning behavior.

Simulation Study of Anchovy Biomass Estimate Begins

Statistician Susan Picquelle has begun a simulation study of the anchovy biomass estimate in order to produce a variance estimate for the biomass. Picquelle first created a new data file containing the spawning fraction, sex ratio, average fecundity, and average weight for each anchovy trawl taken during the years 1978-1980 and the months February-April. She then randomly sampled (with replacement) 23 trawls from this data file, producing "cruise" estimates for each parameter. This process was repeated many times, producing frequency distributions of the overall cruise estimates for each parameter. Picquelle is currently examining these distributions to determine the distribution of the overall biomass estimate, and ultimately the desired variance estimate.

Data Collected to Produce Anchovy Biomass Estimate

Dr. Daniel Huppert, Program Leader, reports that the basic data needed to produce an anchovy biomass estimate using the egg production method were collected this month. The Scripps Institution of Oceanography plankton group completed sorting the 8104 CalVET vertical egg tow samples taken in the April survey. The larval laboratory, headed by Fishery Biologist Dr. Geoff Moser, has completed staging of the anchovy eggs and has identified other fish larvae from the 8104 CalVET samples. Staged anchovy eggs from 8102 and 8104 surveys are being aged by Fishery Biologist Dr. Gary Stauffer and Statistician Susan Picquelle; ageing is 3/4 complete for 8102 and 1/4 complete for 8104. The adult anchovy samples collected on the midwater trawls also continue to be processed. Beverly Macewicz, Staff Research Associate, under contract from the University of California, San Diego, has completed the staging of the spawning condition of female ovaries for 8102 trawl survey. These data are currently being checked for completeness before being keypunched.

The staging of the ovaries from the second cruise is about 1 month behind schedule. Biological Technician Eric Lynn and Fishery Biologist Pete Paloma are now helping to stage ovary spawning condition, which will expedite the processing of the 8104 samples. The frozen anchovies used to determine sex ratios are also being processed; this is expected to be completed by mid-September. The fecundity samples from both surveys have all been processed and are ready for analysis of batch fecundity estimates.

Assessment Made of California Squid Resource and Fishery

This month Industry Economists Jane McMillan and Dr. Daniel Huppert completed a summary assessment of the squid fishery in southern California for the Fisheries Management Division of the Southwest Region. This summary, along with the biological assessment made by Dr. Gary Stauffer, Fishery Biologist, and Alec MacCall, California Department of Fish and Game Marine Biologist at the La Jolla Laboratory (see July 1981 issue of the SWFC Monthly Report for assessment details), provided some of the information necessary to evaluate the proposed domestic fishery for delivery of mackerel, squid, and anchovies to a foreign processing ship leased by the Marine Resources Company

of Seattle, Washington. Four summary conclusions were made from the assessments:

1. The southern California portion of the squid stock has a biomass of approximately 360,000 metric-tons and a preliminary optimum yield of 45,000 metric tons.

2. Southern California annual harvests have ranged from about 7,000-11,000 metric tons during the past 6 years. This reflects the size of the squid market and the local processing activity. Since there is no indication that the economic situation is likely to change in the coming year, the estimated domestic annual processing capacity is 11,000 metric tons.

3. Southern California fishing for squid involves dip net and roundhaul gear. While the dip nets account for most of the harvest, the San Pedro purse seine fleet possesses most of the fishing capacity for squid. Underutilization of this fleet is evidenced by the daily limits placed on the fleet by the local processors and by the recent efforts of the Fisherman's Cooperative Association of San Pedro to seek additional market outlets for fish.

4. Without additional markets for squid, the annual domestic harvest cannot logically exceed the annual processing of 11,000 metric tons. Huppert and McMillan estimate, however, that the purse seine fleet can harvest at least an additional 3,000 metric tons of squid (and much more anchovy and mackerel) without detracting from harvests of the local processors.

Oceanic Fisheries Resources Division

MARINE MAMMAL BIOLOGY AND TECHNOLOGY PROGRAM

Permit to Tag California Sea Lions Granted

The staff of the Southwest Fisheries Center's Coastal Marine Mammal Project has received permission to tag up to 1,600 California sea lions on San Nicolas, San Miguel, Santa Barbara, and San Clemente Islands. Over a 3 year period, 1,000 pups and 50 subadults and 550 adults will be captured, marked, and released. Captures will involve physical restraint; chemical immobilizers will not be used because of the lack of information on their use. Most animals will be flipper-tagged, marked with bleach, and released. A small number of animals will be branded. Most of the "take" will occur at San Nicolas Island, where Carolyn Heath, University of California at Santa Cruz, is under contract to conduct studies on the behavior and population dynamics of California sea lions.

Tagging Studies on California Sea Lions Continue at San Nicolas Island

Computer Specialist Charles Oliver participated in tagging work on San Nicolas Island during a 4 day period this month. Carolyn Heath and John Francis, University of California at Santa Cruz, have been on the island since June, conducting studies on the behavior and reproduction of California sea lions under a contract with the National Marine Fisheries Service. Detailed observations on the breeding sequence, establishment of territory, pupping, mating, and dispersal were recorded. Actual tagging of animals was held off until the end of the breeding period so as not to disrupt the rookeries or the mother-pup bond. The actual tagging work involved herding small groups of pups together on the beach and then weighing, sexing, and double tagging each pup (see Figure 1). Jumbo Rototags and resie tags were used, all red in color. One hundred and eight-five pups were tagged at two separate beaches. In addition, two adult females and three juveniles were tagged. The tagging studies will provide information on pup survival, movement, and age of sexual maturity, for use in assessing the health of the sea lion population.

Figure 1. Computer Specialist Charles Oliver stands on a scale while holding a California sea lion pup. The pup was captured, weighed, and tagged during a tagging study of California sea lions on San Nicolas Island. Oliver will subtract his weight from the total to find the weight of the pup.

Field Work on California Sea Lions at San Clemente Island Initiated

Charles Oliver, Computer Specialist, has recently been assigned responsibility for pinniped research on San Clemente Island, California, and has initiated studies on California sea lions there in conjunction with similar studies at San Nicolas, San Miguel, and Santa Barbara Islands. Oliver and Mark Lowry, Biological Technician, spent 3 days this month on San Clemente Island evaluating pup production and conducting a census on sea lions. Annual pup counts from all rookeries in the Southern California Bight will form the basis of a stock assessment proposed for 1984. Oliver will start a mark/recapture study on sea lions in September that will provide information on pup survival, movements, and age at sexual maturity. Two other species of pinnipeds which pup on San Clemente Island, harbor seals and northern elephant seals, are expected also to be studied.

Summary of Sea Lion Literature Completed

Lisa Ferm, Biological Technician, has completed a review of all of the aerial/ground counts for California sea lions from 1927 to the present. The review examines counts by area and time of year. Her findings provide information on changes in distribution and abundance over time, and will be of use in an overall assessment of the sea lion stocks. Ferm is also engaged in a review of the distribution of sea lion pups on the Channel Islands.

Comprehensive Report on Tagging, Freeze Branding, and Tattooing of Delphinids Completed

Jacqueline G. Jennings, Fishery Biologist, reports that a manuscript has been completed which describes the extensive research and development on dolphin tags, freeze branding, and tattooing techniques carried out under her direction by investigators at the Southwest Fisheries Center and the Hubbs-Sea World Research Institute (HSWRI). M.J. White, Jr., formerly of the HSWRI, L.H. Cornell of the HSWRI, and W.F. Gandy of the Southeast Fisheries Center, NMFS, participated in the project, and White was the leader in assembling the manuscript under a contract to the HSWRI.

Planning Progresses for Conference on Cetacean Reproduction

The International Whaling Commission (IWC) has approved funds for support of the conference, "Cetacan Reproduction: Estimating Parameters for Stock Assessment and Management," to be held in La Jolla November 28 through December 7, 1981. The IWC is co-hosting the conference, together with the Southwest Fisheries Center and the U.S. Marine Mammal Commission.

The IWC funding is in addition to funds to be provided by the SWFC and the Marine Mammal Commission for this conference. Fifty-one papers are scheduled for presentation during the 3-day symposium opening the conference. A 5-day workshop following the symposium will include practical sessions on terminology, interpretation of ovarian scars, concepts of reproduction models, sampling problems, comparative morphology and pathology of the reproductive

system, data and specimen needs for stock assessment and management, and collection, storage, and preparation of materials. Approximately 40 scientists will participate in the workshop.

Participants in the conference will hail from China, South Africa, Norway, France, Japan, Great Britain, Canada, Australia, New Zealand, Denmark, Sweden, Brazil, India, Oman, Ireland, Mexico, the U.S.S.R. and the U.S.

Research to Reduce Dolphin Mortality is Concluded

This month marks the end of the Marine Mammal Technology Project after more than 10 years of investigations to reduce the kill of dolphins incidental to the tuna purse seine fishery. James Coe, Fishery Biologist and Leader of the Marine Mammal Technology Program, has left the Center to take up his new assignment at the Northwest and Alaska Fisheries Center. Dave Holts, Fishery Methods and Equipment Specialist, will join the Tuna and Billfish Resources Program at the La Jolla Laboratory. Dick Butler, Fishery Methods and Equipment Specialist, departs next month for the Southeast Fisheries Center at Pascagoula, Mississippi, to begin his new assignment. Tod Foster, Biological Technician, has joined the Tuna and Billfish Resources Project at La Jolla. Bill Brinkerhoff, Biological Technician, joins the staff of the Life History and Systematics Project in the Marine Mammal Biology and Technology Program. Mark Lowry, Biological Technician, will work with Dr. Doug DeMaster, Leader of the Coastal Marine Mammal Project.

MARINE MAMMAL MONITORING AND ASSESSMENT PROGRAM

Porpoise Kill Monitoring System Converted to VAX

Dr. Tim Smith, Program Leader, reports that the computer programs used to generate the biweekly estimates of cumulative porpoise kills have been successfully converted from INFONET to the VAX computer system. The conversion involved rewriting some programs already in FORTRAN, and substituting two previously written general programs (EVOLVE and PROJECT) for the main program used on INFONET.

The accuracy of the conversion has been tested by parallel runs on VAX and INFONET for three separate periods. Results were very similar, with some minor differences due to alternate handling of some details of prorating unknown species observations, of observer trips which are interrupted, and of trips prior to the first radio report.

Computer Programmer Ken Wallace worked on the conversion with contract personnel Jay Walker, Susan Boyer, and Celia Jacobs. Biological Statistician Bruce Wahlen completed the conversion testing runs.

Relative Porpoise Abundance Studies Proceed

Fishery Biologist Tom Polacheck has returned to the La Jolla Laboratory to work with the Marine Mammal Monitoring and Assessment Program staff as part of his study on the relative abundance of porpoise. Polacheck, a Southwest Fisheries Center student employee stationed in Eugene, Oregon, is examining data taken from logbooks of the Inter-American Tropical Tuna Commission (IATTC) and by National Marine Fisheries Service observers on tunaboats; measures of abundance of porpoise will be determined from observer data based upon rates of encounter between the tunaboats and schools of porpoise. At the La Jolla Laboratory Polacheck will give special attention to extracting and analyzing these data, and to theoretical studies of searching behavior by fishermen. The ultimate goal of this work is to interpret relative measures of abundance of porpoise from the fishing vessel data.

TUNA/BILLFISH RESOURCES PROGRAM

Socio-economic Survey of Southern California Billfish Anglers Underway

Dr. Samuel F. Herrick, Industry Economist with the Tuna/Billfish Resources Program, reports that a socio-economic survey of participants in the southern California recreational billfish fishery is now underway. The survey, which was implemented through a contract with the Pacific Marine Fisheries Commission, is being conducted at major recreational billfish landing sites along the southern California coast from San Diego to the Los Angeles area. At each site billfish anglers just completing a fishing trip were asked a series of questions concerning their annual level of participation in the fishery, queries on some economic aspects, and were asked about their degree of enjoyment derived from fishing.

Approximately 1,000 billfish anglers will be interviewed from August through November of 1981 and May through June of 1982. The data collected through the survey will be used to provide information and analyses that can be incorporated into the formulation of management policy for the west coast commercial and recreational billfish fisheries.

Excellent Conditions for Striped Marlin Forecast for September in Southern California

The southern California striped marlin fishery has experienced excellent fishing since mid-August and catches in the San Diego area now total over 300 fish, well above the 1980 total catch of 95 fish. Environmental data relative to sea surface temperature patterns and catch would indicate that excellent fishing should continue into September, with little intensification in upwelling or cooling resulting from the predicted position and strength of the northwestern Pacific high pressure zone.

Draft of Billfish/Shark Management Plan Completed

Fishery Biologist James L. Squire, Jr., Plan Team Leader, reports that a preliminary working draft of the Billfish and Oceanic Shark Fishery Management Plan (FMP) has been completed, and that the Pacific Council's Management Plan Development Team is reviewing the document. The draft FMP is scheduled for presentation to the Pacific Fishery Management Council at its October meeting.

Status of Atlantic Tuna Fishery Sampling Programs

During the period January 1, 1981 to September 1, 1981, four U.S. tuna purse seiners fishing in the Atlantic Ocean unloaded in Puerto Rico. Seventeen size composition samples were collected for the Southwest Fisheries Center by Inter-American Tropical Tuna Commission personnel. The sampling distribution by species is as follows:

Sampled	Vessels sampled	# of samples	# of fish sampled
Yellowfin	4	6	300
Skipjack	4	10	498
Bigeye	2	3	53

Foreign-caught Atlantic tunas transshipped to Puerto Rico are sampled routinely for biological information by Biological Technician Eugene Holzapfel. Data on fork length, weight, and species composition of catches are collected. Results of Holzapfel's sampling during the period January 1, 1981 to September 1, 1981 are as folows:

Species	Gear	No. of samples	No. of Fish Sampled	Tonnage sampled (MT)
Yellowfin	Baitboat	4	239	38.54
	Purse Seine	7	416	1833.48
Skipjack	Baitboat	1	50	63.29
	Purse Seine	3	150	495.38
Bigeye	Baitboat	3	66	4.30
	Purse Seine	1	36	80.54

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Stock Assessment of Widow Rockfish Near Completion

Dr. William H. Lenarz, Leader of the Rockfish Analysis Task, has been conducting a stock assessment of widow rockfish at the request of the Pacific Fishery Management Council (PFMC). Lenarz is in charge of the assessment which is being carried out by the PFMC's Groundfish Management Team. Widow rockfish were not subject to a directed fishery until 1979 when about 4,000 MT were landed in Washington, Oregon, and California ports. The catch quintupled to 20,000 MT in 1980 and is projected to reach 28,000 MT or more in 1981; the optimum yield is presently set at 20,000 MT. The PFMC is concerned that serious curtailment of the fishery may be required when the Groundfish Management Plan is implemented. Because of this concern the Council instructed the Groundfish Management Team to report on the status of the fishery in October. Lenarz is in the process of completing the analysis and will prepare a report for the Team to present to the Council. The Team will meet in Portland, Oregon, on September 30 to discuss the report.

Papers Readied for Western Groundfish Conference

Dr. William H. Lenarz reports that he and Dr. Robert Francis of the Northwest and Alaska Fisheries Center have received titles for 32 papers to be presented at the Western Groundfish Conference. The papers cover a wide range of subjects such as sampling and stock assessment, life history, socio-economics, food webs, behavior and simulation modeling. Scientists from the four Pacific Coast states and Hawaii have indicated that they will participate. The Conference will be held in Gleneden Beach, Oregon, November 18-20, 1981.

Lingcod Stock Assessment Underway

Fishery Biologist Peter Adams of the Predator-Prey Task is currently conducting a lingcod (Ophiodon elongatus) assessment for the Groundfish Management Team of the Pacific Fishery Management Council. At this time lingcod is managed by gear regulations: there is no numerical or optimum yield quota. Regulation is further complicated by the fact that lingcod is usually taken as an incidental rather than targeted catch. Stock assessment activities of the lingcod will be integrated into a feeding study which is a regular part of the Predator-Prey Task.

Computer Program Reference Directory Being Prepared

Nancy Wiley, Leader of ADP Task, reports that Susan Logan, NOAA Jr. Fellow, is creating the preliminary version of a reference directory for computer programs available at the Tiburon Laboratory. The directory is intended to assist all computer users in finding programs that are suited to their needs and will provide them with the information necessary to access and use these programs. Logan is creating a list of the programs, their functions, and a separate documentation packet. This new file system should encourage the addition of new programs as they are written.

UNDERUTILIZED FISHERY RESOURCES INVESTIGATION

Bids Solicited for Beam Trawl

The Tiburon Laboratory is presently soliciting bids for a 40-ft beam trawl which will be tested for its efficiency in catching ridgeback prawn (Eusicyonia ingentis) and perhaps other species off the California coast. During the last several decades the development of otter trawls has largely eliminated the more primative beam trawls from most fisheries. However, it is estimated that more than 25% of the energy used to tow an otter trawl is "lost" in overcoming friction and hydrodynamic forces acting on the doors. Thus, beam trawling offers fuel-saving potential.

Social and Economic Conditions in Sablefish Fishery Reported

A draft report dealing with the social and economic conditions that prevail in the sablefish fishery has been received from contractor Michael Orbach of the University of California, Santa Cruz. The report will be completed following a meeting among the contractor and various scientists who will be reviewing the draft.

In addition, a quarterly report on sablefish product yield has been received from Contractor Cooperrider-Ryan. The report deals with fillet yield and headed and gutted yield for sablefish caught by trawls and traps in Monterey, California.

Bids Solicited from Commercial Trawlers for Catching Shortbelly Rockfish

Saltonstall-Kennedy funds received recently by the Tiburon Laboratory will allow study of the feasibility of using off-bottom trawls for catching shortbelly rockfish. The funds will be used to charter a commercial trawler to test two trawls which require traditional bottom doors, but whose footropes do not touch the ocean floor. If either of the trawls can successfully catch shortbelly rockfish while keeping by-catch to a low level, then it is likely

that smaller vessels can be used in a fishery for shortbelly. This would allow a lower market price than would be the case were the larger midwater trawlers required.

Giant Pacific Octopus Pass Preliminary Processing Tests

This month samples of giant Pacific octopus (Octopus dofleini) were sent to a processor in Los Angeles as part of a continuing effort to develop a fishery for this octopus on the north coast of California. The octopus averaged around 15 pounds, which is considerably smaller than most individuals of this species landed in northern California. The processor found the octopus to be acceptable for retail sale in Japanese markets. When seasoned and dried, the octopus sample earned high grades in texture and taste. Further tests will be carried out to learn if marketable products can be economically produced from large octopus.

SOUTHWEST REGIONAL DATA MANAGEMENT AND ADP OPERATIONS

Department of Commerce Approves Purchase of Computer Equipment for ADP Operations

Fred Kellenberger, Data Systems Manager, reports that the Department of Commerce (DOC) has approved the Southwest Fisheries Center's request to purchase five microcomputers for the implementation and maintenance of the Fishery Information Network (FIN) in the central and western Pacific region. The APPLE PLUS will be located at the following five sources of data collection: Southwest Fisheries Center, Honolulu Laboratory; Hawaii Department of Aquatic Resources in Honolulu; Guam Division of Aquatic and Wildlife Resources, Agana; American Samoa Office of Marine Resources, Pago Pago; and Northern Mariana Islands Division of Marine Resources, Saipan.

The DOC has also approved the Center's request to purchase a Texas Instrument 745 portable terminal, a Tektronix 4025 intelligent CRT terminal, and the Tektronix 4662 interactive digital plotter. This equipment will be located at the Southwest Region to support the Pacific Area Cooperative Enforcement System (PACES), the Financial Reporting System (FRS), and the Market News System on ADP Network Services; other data management systems will be serviced as needed.

Access to University of Oregon Computer System Requested for Vessel Performance Analysis

Dorothy Roll, Systems Analyst, reports that Dr. Tim Smith, Leader of the Porpoise Stock Assessment Program, has requested computer services with the University of Oregon (UO). Tom Polacheck, a SWFC employee stationed at UO, Eugene, Oregon, needs local access to their DEC 1091 and IBM 4341 systems for the extensive analysis of tuna vessel performance data. The statistical packages required for the analysis, the SAS, BMDP, and SPSS, must be resident in the same computer facility. The UO Computer Center satisfies this requirement and other necessary services, such as local high speed printing, local plotting capabilities, and local technical assistance. Roll has forwarded the procurement request form and the sole justification form to Fred Brooks, NMFS Data Management and Information Systems, Washington, DC. Brooks will monitor this request through the required approval channels (the NOAA ADP Policy Division and the Department of Commerce ADP Policy and Procurement Divisions).

Conversion of Financial Reporting System to ADP Services Continuing

This month Systems Analyst Dorothy Roll met with Computer Programmer Oden Burris and John Davies, Computer Specialist stationed with the Southwest Region, to discuss the progress of converting the Financial Reporting System (FRS) from INFONET to ADP Network Services. The data loading and editing programs are completed and functional. Computer Specialist Robert Butler is monitoring the transfer of all data from the INFONET system to magnetic tapes and the verification of the data tapes on the UCSD Burroughs/VAX systems. The

completion of the report programs is targeted for September 15 and parallel testing of the system will begin the week of September 21. With the INFONET service contract terminating on September 30, the required FY-81 FRS reports are scheduled for completion on September 22. This lead time is necessary for report verification and possible re-runs before the termination day. On October 1 INFONET can no longer be accessed.

Computer Equipment Inventory Being Developed on VAX

Robert Butler, Computer Specialist, is currently developing a computer equipment inventory system on VAX, using DATATRIEVE software. The inventory lists the numerous keyboard terminals, the CRT's and the microsystems, such as the APPLE II, the Hewlett Packard, and Tecktronics systems. The elements in the file include the purchase order number, manufacturer model number, equipment serial number, task number, lease/own, cost (purchase or monthly lease), maintenance company, repair service record, room location of equipment, and the responsible security person.

Technical Users Meetings Held

ADP Operations hosted three Computer Technical Users Meetings during August. One session was conducted by Jerry Krause, supervisor of day operations at UCSD's Computer Center. Krause discussed proper tape handling procedures and other operational procedures. The other two session focused on DATATRIEVE, a data management, retrieval, and reporting tool on VAX.

MISCELLANEOUS

HONORS AND AWARDS

Tiburon Laboratory

On August 7 James R. Chess, Fishery Biologist, received a Special Act Cash Award.

PUBLIC AFFAIRS

Honolulu Laboratory

On August 8 personnel from the Honolulu Laboratory set up an open house display at the Nanaikapono Elementary School grounds in connection with the "Nā waiwai o ke kai 81," a Hawaii state-wide conference on the Waianae coast of Oahu from August 1-8, 1981. Other agencies participating in the event included the University of Hawaii Sea Grant Program, the Marine Options Program, the Hawaii Division of Aquatic Resources, the Blue Water Marine Laboratory, and several privately-funded organizations. The Honolulu Laboratory display was put up and manned by Fishery Biologist Richard Uchida, Scientific Illustrator Tamotsu Nakata, Research Assistants Bernard M. Ito, Victor A. Honda, Bert S. Kikkawa, Robert E. Moffitt, Alan R. Everson, and University of Hawaii graduate student Walter N. Ikehara.

SEMINARS

La Jolla Laboratory

August 11 - Dr. Donald A. McCaughran, International Pacific Halibut Commission, Seattle, Washington, presented a seminar on "Status of Pacific halibut stocks and current management problems."

August 13 - A representative of the GSA FTS presented two talks on how to use the FTS system at the Center.

August 25 - Dr. Steve Reilly, Post-Doctoral Research Associate, National Research Council, NOAA, Southwest Fisheries Center, presented a talk on "Gray whale population assessment."

Tiburon Laboratory

August 11 - Harold Chadwick, California Department of Fish and Game, spoke on "Perspectives of the impact of water development on the Sacramento and San Joaquin Estuary" at a joint San Francisco State University/Tiburon Laboratory seminar held at the Tiburon Laboratory.

TRAINING

Honolulu Laboratory

August 18-20 - Sharon Lundin, Chief of Employee Services, NASO, conducted training sessions on the General Workforce Performance Appraisal System for Honolulu Laboratory supervisory and nonsupervisory personnel.

La Jolla Laboratory

June 30 - August 6 - Thomas Gronholt, Biological Technician - "Introduction to Data Processing," La Jolla, California.

Tiburon Laboratory

August 15 - Maxwell Eldridge, Supervisory Fishery Biologist - Full-time training at Oregon State University, Corvallis, Oregon.

August 18 - Walburga Giguere, Administrative Officer - "Full-time Equivalent Work Year Ceilings on Federal Government," San Francisco, California.

VISITORS

Honolulu Laboratory

August 6 - Sam Pooley, Western Pacific Regional Fishery Management Council, and Gerald Marten, East-West Center, discussed the draft Spiny Lobster Fishery Management Plan with Laboratory Director Richard Shomura and Dr. Jeffrey Polovina.

August 18 - Paula Johnson, Auke Bay Laboratory, Northwest and Alaska Fisheries Center.

August 26 - Dr. J. Wankowski (formerly with the Government of Papua New Guinea), who will be taking a position in Australia, visited Tamio Otsu, Dr. Robert Skillman, and Fletcher V. Riggs.

La Jolla Laboratory

August 3 - Dr. J.C. McKee, Director of the Associate Program of the National Research Council, came to the Center to meet with Deputy Director John Carr.

August 5 - A class from Scripps Institution of Oceanography visited the Center.

August 7 - Euna A. Moore, University of the West Indies, Barbados, West Indies.

- V.G. Jhingran, Director of the Central Inland Fisheries Research Institute, India.

August 10 - Carl Nettleton, National Coalition for Marine Conservation, San Diego, California.

- Francisco Lopez Capent, Universidad Technologia Pesquera Santiago de Compostenes, Spain.

- Assane Samba of Senegal.

August 13 - Susan Cassell, Assistant U.S. Attorney, San Diego, California.

August 17 - Pete Rowe, Virginian - Pilot, Norfolk, Virginia.

August 18-20 - Dr. William Aron, Director of the Northwest and Alaska Fisheries Center, Dr. Robert Edwards, Director of the Northeast Fisheries Center, and Dr. William W. Fox, Jr., Director of the Southeast Fisheries Center, visited the Center in order to participate in the Research Council meeting.

August 18-26 - Dr. Lamarr Trott, Chief of the Fisheries Assessment Division, NMFS, came to the Center to participate in the Research Council meeting and to meet with Center personnel.

August 21 - Ken Carder, NASA, Washington, DC.

August 24 - Jacek W.J. Wankowski, Ministry for Conservation, Marine Science Laboratories, Victoria, Australia.

Tiburon Laboratory

August 6 - Peter Boule, Department of Zoology, University of Aberdeen, Aberdeen, Scotland.

August 11 - Tom Jow, and Bob Tasto, California Department of Fish and Game, Menlo Park, California.

- Pete Chadwick, California Department of Fish and Game, Stockton, California.

August 13 - Eddie Tate, NASO, Seattle, Washington.

August 19 - A. Williams, SAFCOL, Rozelle NSW, Australia.

August 21 - Eddie Tate, NASO, Seattle, Washington.

August 27 - Dr. Lamarr Trott, NOAA/NMFS, Washington, DC.

MEETINGS AND TRAVEL

Honolulu Laboratory

August 4 - Richard S. Shomura, Laboratory Director, Dr. Jeffrey Polovina, and Richard Uchida participated in a meeting of the Coordinating Council on Research in the NWHI.

August 10 - Richard Shomura, Dr. Robert Skillman, and Dr. Jerry Wetherall met with William Lovejoy and the Scientific and Statistical Committee of the Western Pacific Regional Fishery Management Council to review Lovejoy's billfish model.

August 13 - Richard Shomura, Dr. Jeffrey Polovina, Richard Uchida, Howard Yoshida, and Darryl Tagami attended a meeting which included members of the Western Pacific Regional Fishery Management Council's Spiny Lobster Advisory Panel, Plan Development Team, and the SSC Spiny Lobster ad hoc Committee to discuss the spiny lobster tail width issue.

August 14 - Richard Shomura, Dr. Robert Skillman, and Dr. Jerry Weatherall attended a follow-up meeting to discuss the Lovejoy billfish model.

August 20-30 - Richard Shomura traveled to Noumea, New Caledonia, to participate in the South Pacific Commission's 13th Technical Meeting on Fisheries.

La Jolla Laboratory

July 19-August 7 - Dr. Izadore Barrett, Center Director, traveled to Washington, DC for a detail as Acting Deputy Assistant Administrator for Fisheries.

July 30-August 1 - Dr. John Hunter traveled to Washington, DC to participate in a National Research Council workshop on UV effects.

August 2-10 - Dr. Norm Bartoo traveled to Seattle, Washington to implement the albacore model on micro-computer and to debug and prepare a draft report for the Albacore Workshop.

August 6 - An EEO meeting was held at the Center.

August 6-7 - Dr. Daniel Huppert attended a Scientific and Statistical Committee meeting of the Pacific Regional Fishery Management Council in Portland, Oregon.

August 11-12 - Dr. Izadore Barrett, John Carr, Dr. Reuben Lasker, Dave Mackett, and Dr. Gary Sakagawa participated in Task Review meetings at the Center.

August 11-14 - Dr. Tim Smith traveled to Washington, DC to attend the ad hoc U.S. Scientific Committee meeting on the Antarctic.

August 11-15 - Fred Kellenberger traveled to Portland, Oregon and to Honolulu, Hawaii to attend FIN meetings and to meet with personnel from the Hawaii Department of Fish and Game.

August 14 - A CalCOFI meeting was held at the Center.

August 15-20 - Dr. R. Michael Laurs attended a Coastal Zone Color Scanner meeting in Washington, DC.

August 16-17 - Dr. Reuben Lasker traveled to Boulder, Colorado to attend a briefing for Environmental Research Lab scientists on fishery/environment research at SWFC.

August 18-20 - Dr. Izadore Barrett and Dr. Gary Sakagawa attended a meeting of the Research Council at the Center.

August 21-22 - Dr. Daniel Huppert traveled to Tacoma, Washington to attend a meeting of the Scientific and Statistical Committee.

Tiburon Laboratory

August 6-7 - Norman Abramson, Laboratory Director, traveled to Portland, Oregon to attend a meeting of the Pacific Fishery Management Council's Statistical Committee as Dr. Izadore Barrett's substitute. Abramson also attended meetings of the Council when it was discussing the Pink Shrimp Management Plan.

August 9-15 - Patrick Rutten traveled to Santa Barbara, California to fish for octopus with commercial fishermen.

August 13-14 - The Pacific Fishery Management Council Groundfish Management Team met at the Tiburon Laboratory to elect a chairman and to consider current and future management problems. Attendees included Dr. William Lenarz, Ed Ueber, and Norman Abramson, Southwest Fisheries Center; Tom Jow, California Department of Fish and Game; Al Millikan, Washington Department of Fisheries; Jack Robinson, Oregon Department of Fish and Wildlife; and Dr. Robert Francis, Northwest and Alaska Fisheries Center.

August 23-28 - Edmund Hobson, James Chess, and Susan Smith traveled to Catalina Island, California to monitor and study near-shore communities.

August 28 - Edward Ueber traveled to Santa Cruz, California to oversee the sablefish contract.

PERSONNEL ACTIONS

Honolulu Laboratory

July 26 - Bernard M. Ito, Physical Science Technician - Promotion.

August 8 - Mark A. Scheele, Computer Technician - Termination of Appointment.

9 - Daniel R. Locey, Computer Science Student Trainee (Junior Fellow) - Change to LWOP status.

13 - Michael F. Adams, Industry Economist - Resignation.

18 - Marlene W.L. Dung, Clerk Typist - Termination.

28 - Gordon W. Tribble, Biological Technician (Fisheries) - Resignation.

La Jolla Laboratory

July 31 - James Cotton, Biological Technician - Expiration of Temporary Appointment.

- Robert Pitman, Biological Technician - Expiration of Appointment.

August 5 - Bao Nguyen, Summer Aid - Temporary Appointment.

9 - Mary DeWitt, Clerk Typist - Promotion.

21 - Sandra Paez, NOAA Junior Fellow - Leave Without Pay.

23 - Frank Ralston, Computer Specialist - Promotion.

24 - Colleen Coultas, Clerk Typist - Temporary Appointment.

This summer six students from the federally-funded Upward Bound Program served internships at the La Jolla Laboratory. The Upward Bound Program is designed to motivate and prepare disadvantaged students for college. During the academic year the program provides educational enrichment and supportive services to qualified students. During the summer a residential program is offered which combines college preparatory studies with internships in various career fields.

The following students were interns at the La Jolla Laboratory from July 1 - August 7, 1981:

Maria Perez - Laboratory Aid,
Vivian Phillips - Clerical Aid,
Frances Ramires - Laboratory Aid,
Muoi Thi - Accounting Aid,
Suzanne Vo - Library Aid, and
Marcus Williams - Laboratory Aid.

Three students from the San Diego Regional Youth Employment Program (REGY) also served internships at the La Jolla Laboratory this summer. REGY's Summer Youth Program is a federally-funded CETA Program which provides low income youths between the ages of 14 and 21 with the opportunity to gain "hands-on" work experience, along with a basic orientation to the world of work.

The following REGY students were at the La Jolla Laboratory from June 22 - August 12, 1981:

Curt Allan - Laboratory Aid,
Linda Crispien - Laboratory Aid, and
Anne Mahan - Clerical Aid.

Tiburon Laboratory

August 9 - Delores Fussy, Secretary - Reassignment to Southwest Regional Office, Environmental Assessment Branch, Tiburon, California.

15 - Sally Krenn, Biological Aid - Extension of Temporary Appointment.

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DEPARTMENT OF COMMERCE

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